

## MARINE MOLLUSKS OF HAWAII, IV-VII.

BY HENRY A. PILSBRY.

Since the publication of the first paper of this series,<sup>1</sup> the writer has been able to study part of the important collection of Hawaiian marine shells made by Professor Wm. Alanson Bryan and Mrs. Bryan, which they had brought to the Academy for identification. It is very rich in the shells of Kauai, Oahu and Molokai, also several of the islets of the northwestern group as far as Laysan. The present paper treats also of shells collected by Mr. D. Thaanum, minutiae picked out of shell-sand sent many years ago by Mr. Frederick Stearns, and material collected by the author.

## IV. EULIMIDÆ.

*Melanella bryani* n. sp. Fig. 1.

Laysan Island, Wm. Alanson Bryan, 1902. Type No. 117595, A. N. S. P., paratypes in Bryan collection.

The shell is obliquely conic, the upper half rather strongly curved to the right and backward; smooth, white; the later whorls having

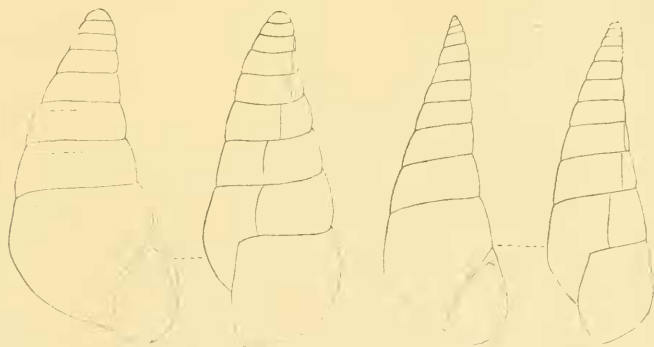


Fig. 1.—*Melanella bryani*.

Fig. 2.—*Melanella minus*.

a broad gray border below the suture, which is somewhat impressed. A single series of well impressed linear varices runs up the right side, receding to a dorsal position in the upper whorls. The whorls are slightly convex. The aperture is small, subvertical. The columella

<sup>1</sup> Marine Mollusks of Hawaii, I-III, these *Proceedings*, pp. 207-230, August, 1917.

is deeply concave; parietal wall rather heavily calloused. The outer lip, in profile view, is almost straight, not arching forward.

Length 10, diam. 5, length of aperture with peristome 3 mm.

*Melanella mimus* n. sp. Fig. 2.

Kailua, Oahu, W. A. Bryan. Type No. 117593, A. N. S. P., paratypes in Bryan coll.

The shell is rather slender, the spire having a distinct double curvature; smooth, white; the suture linear, not impressed. A series of linear varices runs up the right side, spirally receding to the dorsal side as usual. The whorls are almost flat, the last being very obtusely subangular. The aperture is ovate; columella moderately concave, parietal callous thin. The outer lip arches strongly forward.

Length 5.3, diam. 2, length of aperture 1.5 mm.

*Melanella kanaka* n. sp. Fig. 3.

Kailua, Oahu, W. A. Bryan. Type No. 117594, A. N. S. P., paratype in Bryan coll.

The shell is very small, conic, attenuated and recurved in the upper third; smooth, whitish, the suture linear, superficial, broadly gray margined below, the margin defined by a whitish line. A continuous series of impressed, linear varices runs up the right side, receding but little upward. The whorls of the spire are scarcely

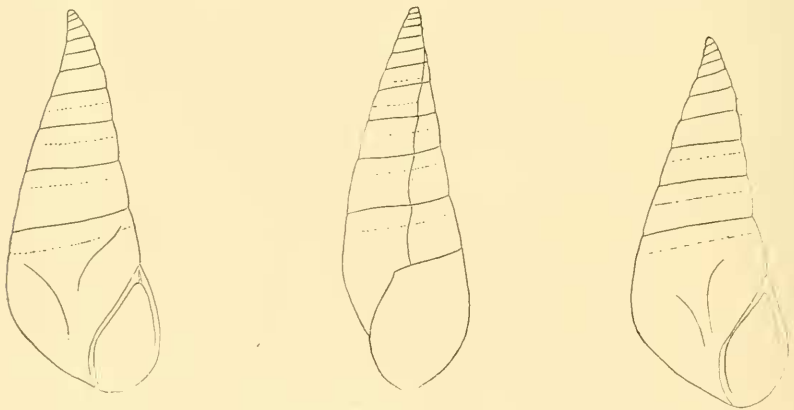


Fig. 3.—*Melanella kanaka*.

convex, the last being moderately convex. The aperture is small, subovate, the inner margin much less curved than the outer. The outer lip arches very strongly forward, as seen in profile.

Length 4.2, diam. 1.62, length of aperture 1.45 mm.; about 10 whorls.

*E. inflexa* Pse., from the Paumotus, is similar in shape but far larger.

A form from Kāhala, Oahu (right fig.), collected by Mrs. A. F. Letson, differs by being a little more conic, the last whorl more ample in the peripheral region. Length 4, diam. 1.7 mm.

*Melanella ima* n. sp. Fig. 4.

Paumalu, Oahu, W. A. and E. L. Bryan. Type No. 11592, A. N. S. P., paratypes in Bryan coll.

The shell is small, slender, the upper half curving strongly to the right; smooth, whitish, the linear suture rather narrowly bordered with gray. The whorls are very slightly convex. The series of linear varices on the right side recedes to the dorsal side above.

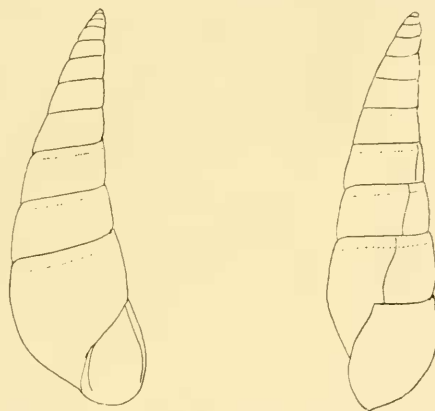


Fig. 4.—*Melanella ima*.

The aperture is shaped as in *M. kanaka*, and as in that species the outer lip arches forward strongly.

Length 4.3, diam. 1.35, length of aperture 1.05 mm.

More slender than *M. kanaka*, and curved for a greater part of its length. The shape of the last whorl distinguishes it from *M. mimus*.

*Melanella letsonae* n. sp. Fig. 5.

Mokapu Point, Oahu. Type No. 117633, A. N. S. P., collected by Mrs. A. F. Letson. Also in Bryan collection.

The shell is very slender, white, moderately curved to the right, somewhat solid. There is a row of varix-lines on the right side, becoming dorsal in the upper part of the spire. The whorls are nearly flat, the suture superficial having a broad gray border below. Last whorl is obtusely subangular above the middle, the base tapering,

slightly convex. The aperture is small, ovate. The outer lip curves forward very strongly in the middle.

Length 4.5, diam. 1.6, length of aperture 1.2 mm.; 10 whorls.

*Melanella lunata* n. sp. Fig. 6.

Mokapu Point, Oahu. Type No. 117634, A. N. S. P., collected by Mrs. A. F. Letson.

The shell is rather slender, somewhat solid, white, very strongly curved to the right and a little backward above. The whorls are nearly flat, and marked with varix-lines on the right, becoming dorsal above. Suture superficial, distinctly but shortly descending to each varix-line and to the aperture, broadly bordered below with gray. The aperture is small, ovate. The outer lip moderately arched forward in the middle.

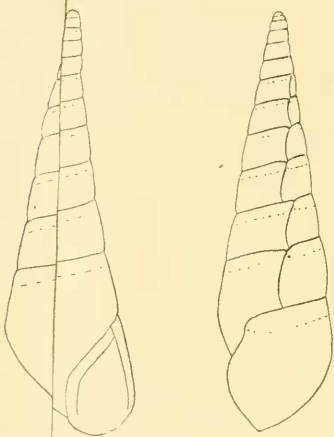


Fig. 5.—*Melanella letsona*.

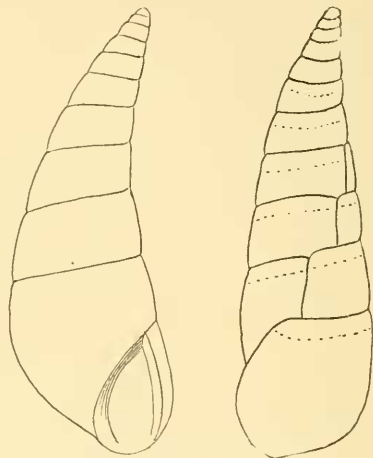


Fig. 6.—*Melanella lunata*.

Length 6.6, diam. 2.3, length of aperture 1.75 mm.; 10 whorls remaining, the apex being imperfect.

By its strong curvature this species resembles *Subularia distorta* Peas, but there is no ridge or keel on the left side of the base, as in the species of *Subularia*.

*Subularia delicata* n. sp.

Mokapu Point, Oahu. Type No. 117632, A. N. S. P., collected by Mrs. A. F. Letson.

The shell resembles *S. metcalfei*, but differs by being smaller and decidedly more slender. It is thin, pellucid, showing the internal column and partitions through the shell. The spire is straight,

whorls slightly convex, having varix-lines on both sides, the last whorl having a short keel below, characteristic of the genus.

Length 4.3, diam. 1.3, length of aperture 1.4 mm.; 9 whorls.

This species will be figured in connection with material on *Subularia* in the next paper of this series.

#### V. THE PYRAMIDELLIDÆ.

Further species of this family are to follow when illustrations can be prepared.

*Turbonilla* (*Chemnitzia*) *oblectamentum* n. sp. Fig. 8.

Haleiwa, Oahu. Type No. 116543, A. N. S. P., coll. by H. A. Pilsbry, 1913. Also Haena, Kauai, W. A. and E. L. Bryan.

The shell is turritid, diameter contained slightly less than three times in the length. Nuclear shell of at least two whorls, tilted towards its spire which is low and half immersed. First post-nuclear whorl having vertical ribs, the rest moderately convex, with sculpture

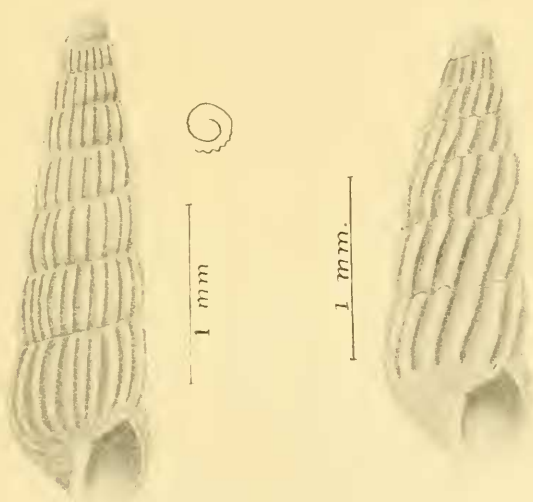


Fig. 7.—*Turbonilla kauaiensis*.

Fig. 8.—*Turbonilla oblectamentum*.

of rather large, rounded, protractive ribs, about 17 on the last whorl, parted by intervals slightly wider than the ribs. On the last whorl the concave intervals stop abruptly at the periphery; yet very slight continuations of the ribs, or part of them, are visible on the base. The suture is deeply impressed, almost channelled. The aperture is ovate, the columella thick, barely perceptibly sinuous, almost straight.

Length 2.45, diam. 0.85, length of aperture 0.6 mm.;  $6\frac{1}{2}$  post-nuclear whorls.

*Turbonilla* (*Chemnitzia*) *kahoolawensis* n. sp.

North shore of Kahoolawe. Type No. 116179, A. N. S. P., coll. by Pilsbry, 1913.

The shell is similar to *T. oblectamentum* except in the following characters. It is relatively narrower. The ribs are similar but more numerous, about 30 on the last whorl, and as wide as the intervals. The suture is very deeply impressed, a little more channelled than in the other species. The nuclear whorls are too much worn to show the shape well. The lateral outlines of the spire are distinctly convex.

Length 3, diam. 0.85 mm.;  $7\frac{1}{2}$  post-nuclear whorls.

*Turbonilla* (*Turbonilla*) *kauaiensis* n. sp. Fig. 7.

Haena, Kauai. Type No. 117626, A. N. S. P., coll. by W. A. and E. L. Bryan; paratype in Bryan coll.

The shell is slender, the diameter contained about  $3\frac{1}{2}$  times in the length, nuclear whorl elevated, smooth. Subsequent whorls are slightly convex, sculptured with smooth, straight, rounded vertical ribs, equal to their equally smooth intervals, and 24 in number on the penult whorl. On the last whorl the ribs extend upon the base, but weaken there. Aperture is rhombic, the columella stout, very weakly sinuous.

Length 2.75, diam. 0.8, aperture 0.6 mm.;  $7\frac{1}{2}$  post-nuclear whorls.

This very minute species differs from *T. kahoolawensis* by the simple suture, the extension of the vertical ribs upon the base, and the nearly straight outlines of the spire.

*Turbonilla* (*Chemnitzia*) *thaanumi* Pils. and Van.

1908. *Turbonilla* (*Chemnitzia*) *thaanumi* P. and V., *Nautilus*, vol. 22, p. 58, fig. 3.

Hilo, Hawaii, D. Thaanum.

This minute shell differs from the preceding by the abrupt termination of the intercostal valleys on the last whorl.

*Turbonilla* (*Evaletta*) *elizabethæ* n. sp. Figs. 9, 9a.

Waianae, Oahu. Type and paratypes No. 117596, A. N. S. P., coll. by W. A. and E. L. Bryan; paratypes in Bryan coll. Also from Waikiki beach (Stearns), Honolulu Harbor, Paumalu, Mokapu Point (Bryan), and Kahala (Mrs. Letson), Oahu. Haena and Hanalei River, Kauai (Bryan), Kailua, Kona coast of Hawaii (Bryan), Laysan Island (Bryan).

The shell is subulate, the upper third or half pink, the rest white.

The initial whorl is low, with inturned tip, following whorls are convex, regularly increasing, very densely microscopically striate spirally. The suture is narrowly channelled. The slopes of the spire are nearly straight. The aperture is ovate, oblique. The columella bears a small fold, visible in oblique view in the mouth, but so far immersed that it is not seen in direct front view.

Length 6.7, diam 1.65, length of aperture 1.65 mm.; 10 whorls (type).

Length 7.6, diam. 2, length of aperture 1.7 mm. (largest specimen seen).

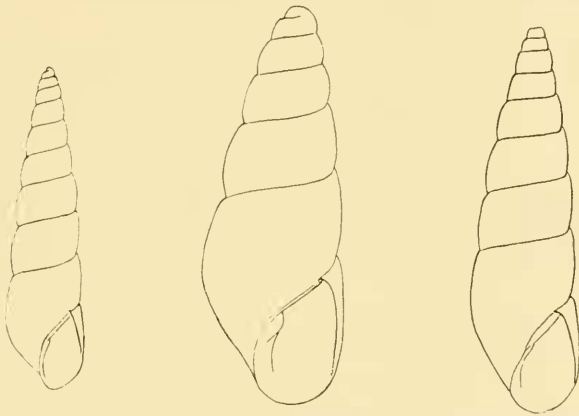


Fig. 9.—*Turbonilla elizabetha*. 9a.—A young specimen from Honolulu, length 2.8 mm.

Fig. 10.—*Turbonilla laysanensis*.

This pretty, delicately colored shell is named for Mrs. W. A. Bryan. The nuclear whorl is so far immersed that it resembles that of *Odostomia*. By Dr. Bartsch's key, it runs nearest to the subgenus *Careliopsis* Möh; but that differs by the characters of the nuclear shell. *T. elizabetha* is here made the type of a new subgenus to be called *Evaletta*, characterized by the low, inturned nuclear whorl and the evenly convex whorls, microscopically striate spirally. The lengthened form and numerous whorls separate it from *Odostomia*, wherein it approaches the subgenus *Eralina* somewhat.

*Turbonilla* (*Evaletta*) *laysanensis* n. sp. Fig. 10.

Laysan Island. Type No. 117627, A. N. S. P., collected by W. A. Bryan.

Shell similar in color and shape of the whorls to *T. elizabetha*, but of decidedly broader form, and of fewer whorls in a shell of greater length. The type has lost the nuclear whorl.

Length 8.7, diam. 2.2 mm.; 8 post-nuclear whorls.

*Turbonilla (Lancella) varicosa* (A. Ad.). Pl. XXII, figs. 5, 6, 7.

1853. *Chemnitzia varicosa* A. Ad., P. Z. S., p. 181, Pl. 20, fig. 15.

1860. ? *Turbonilla decussata* PEASE, P. Z. S., p. 438.

Off Honolulu in 6-8 fathoms, dredged by Mr. D. B. Kuhns. Also in the Thaanum-Kuhns collection. Some young specimens were taken at Haena, Kauai, by Prof. and Mrs. Bryan.

The shell is slender, turritid, with long, attenuate spire, cinnamon colored, or nearly white with cinnamon bands. Nuclear shell of one smooth elevated whorl, the spire exposed, low. Post-nuclear whorls are moderately convex, with sculpture of close, rounded, axial ribs, their intervals deep and equal to the ribs on the upper whorls, about half as wide as the ribs on the last four whorls. There are also swollen white varices as wide as three to five ribs, at irregular intervals, more numerous in the lower whorls; in all 8 in the specimen shown in fig. 5. The axial ribs and varices are crossed by rather strong spiral cords, about 10 between sutures, the fourth from above being a little larger than the others. The last whorl is rounded peripherally and has a short, convex base. The aperture is trapezoidal, angular at the base of the columella. Columella vertical, with a sharp, very oblique spiral fold at the base. Parietal callous scarcely noticeable.

Length 22, diam. 4.7, length of aperture 4.2 mm.; 15 post-nuclear whorls.

*Chemnitzia varicosa* was described from the "Eastern Seas." The description and figure agree well with Hawaiian specimens.

I have not seen *T. cornelliana* Newe., from Honolulu.

The subgenus *Lancella* Dall and Bartsch was founded by W. H. Pease (under the preoccupied name *Lancea*) for large, varicose *Turbonillas* having conspicuous vertical and spiral sculpture, a prominent nucleus tilted towards its very low spire, and a small spiral fold emerging *near the base* of the columella. In this last feature it differs from all other *Turbonillas*, and perhaps the group should be ranked as a genus.

Besides the species described or mentioned below, the following belong here: *T. elongata* Pease (name preoc., = *T. peasei* D. and B.), the genotype, from Paumotus. *T. bella* D. and B., of Japan. Also, apparently *T. cornelliana* Newe., from Honolulu, and possibly *T. grandis* (*Chemnitzia grandis*) Ads. and Rve., neither of which I have seen.

*Turbonilla (Lancella) vitiensis* n. sp. Pl. XXII, fig. 4.

The shell is turritid, white; embryonic whorl on edge but leaning towards its spire, which is low. Subsequent whorls with sculpture



of low, rounded vertical ribs, somewhat unequal, and parted by narrow furrows; there are about 24 such ribs on the penult whorl; also very few swollen varices, in the type three: on the left side of the last whorl, on the third, and on the sixth whorls above the last. Over ribs, intervals and varices there are seven low spiral cords, much wider than their intervals, on each whorl to the last, which has 17, the lower cords being narrower there. The aperture is trapezoidal; outer lip simple; columella straight, vertical, having a small, steeply ascending spiral fold near the base. It joins with the basal margin in a rather small curve, but there is no angle at the junction.

Length 15.5, diam. 4 mm.; aperture 3.3 mm. long; 13 post-embryonic whorls.

Viti Islands. Type and 2 other specimens are No. 20046. A. N. S. P., collected by A. J. Garrett.

Several lots sent by Mr. Garrett at different times show this to be rather constant in size and other characters. There are usually two distinct and often one small varix. The name *vitiensis* was used on one of Garrett's labels, but I cannot find that he published it.

***Turbonilla vitiensis clavus*** n. subsp. Pl. XXII, fig. 3.

The shell is similar to *T. vitiensis* except that it is more slender; penult whorl with 20 vertical ribs.

Length 12.5, diam. 2.9 mm.; length of aperture 2.5 mm.; 13 post-embryonic whorls.

Viti Islands. Type No. 117597, A. N. S. P., collected by A. J. Garrett.

***Odostomia (Odostomella) patricia*** n. sp. Fig. 11.

Waikiki beach, near Honolulu. Type No. 93944, A. N. S. P., collected by Frederick Stearns.

The shell is oblong, solid, white, the last whorl encircled with three cinnamon bands, two of which are visible on the penult and one on the preceding whorl. The nuclear whorl is rather well elevated, smooth. Subsequent whorls have rounded axial ribs as wide as their intervals, about 20 on the last whorl, where they continue over the base, though weaker below. Under a high power some weak spiral striation is visible on the base. The suture is narrow and rather deeply impressed. The aperture is rather narrowly ovate, oblique. Columellar fold small.

Length 1.6, diam. 0.7, length of aperture 0.55 mm.;  $4\frac{1}{2}$  whorls.

This species is smaller than *O. doliolum*, with narrower ribs, but much the same coloring.

There is a similar pink form with roseate apical whorl, which may be called var. *rosa*, and another form, similarly colored, with only about 16 larger ribs on the last whorl and having the nuclear whorl larger; it may be named var. *rhodocephala*.



Fig. 11.—*Odostomia patricia*.



Fig. 12.—*Odostomia syrtites*.

*Odostomia (Chrysallida) stearnsiella* n. sp. Fig. 14.

Waikiki beach, near Honolulu, Oahu. Type No. 93931, A. N. S. P., collected by Frederick Stearns.

The shell is ovate-conic, solid, white. Nuclear whorl regular, well raised, the apex turned in; two or three following whorls have weak axial folds. All of the post-nuclear whorls have narrow spiral furrows; on the last whorl there are four above the periphery, the upper one widest, and after a peripheral smooth zone the base has about 6 weak spiral cords. The aperture is ovate, the columellar fold strong.

Length 3.5, diam. 1.4, length of aperture 1.3 mm.;  $5\frac{1}{2}$  post-nuclear whorls.

*Odostomia (Miralda) syrtites* n. sp. Fig. 12.

Waikiki beach, Oahu. Type No. 93934, A. N. S. P.

The shell is ovate-conic, white. Nuclear whorl smooth, somewhat elevated, the apex depressed. Following whorls of the spire having a broad raised zone, indistinctly bipartite, bearing somewhat oblique ribs; this is followed by a spiral sulcus and a stout smooth spiral ridge. On the last whorl the depression dividing the upper zone is deeper; there are about 26 oblique ribs. From the periphery down there are about seven spiral ridges, the last three quite weak. The aperture is ovate, oblique. Columellar fold strong, rather thick.

Length 1.7, diam. 0.95, length of aperture 0.65 mm.  $4\frac{1}{2}$  whorls in all.

There are more basal keels than in *O. scopulorum* Watson, and the

shell is broader. Though larger, it has a whorl less than Watson's species.

*Odostomia* (Miralda) *scopulorum* Watson. Fig. 13.

*Odostomia scopulorum* WATSON, Challenger Rep., Gastrop., p. 485, Pl. 31, fig. 5.

Reefs off Honolulu, 4 fathoms (Challenger). Hilo, Hawaii (D. Thaanum).

The original figures are copied. The specimen measures 1.2 mm. long, 0.5 wide, having 5 whorls. There is "a strong, oblique, deep-set tooth about the middle" of the inner lip.

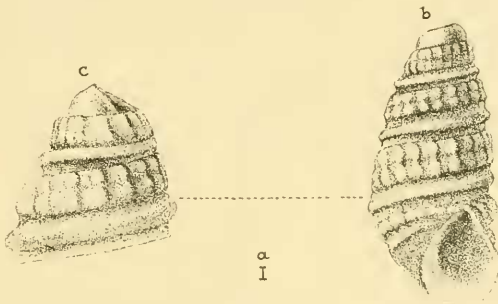


Fig. 13.—*Odostomia scopulorum*, after Watson. Shell  $\times 35$  and apex  $\times 60$ .

Mr. Thaanum's specimens agree well with the type description and figures.

*Odostomia* (Miralda) *paulbartschi* n. sp. Fig. 15.

North shore of Kahoolawe. Type No. 116163, A. N. S. P., coll. by Pilsbry, 1913. Also beach east of Honolulu, No. 93940.

The shell is tapering-oblong, white. The nuclear whorl is smooth, convex, low, with depressed tip. Following whorls of the spire have two large, rounded spiral ridges, bearing slightly oblique nodes which are weakly connected across the median depression: a narrow smooth cord revolving immediately above the suture. On the last whorl the post-sutural cord continues at the periphery, and there are three spiral cords on the base. The aperture is somewhat oblique. Outer lip scalloped. The columella is narrow, terminating above in a small fold.

Length 2.3, diam. 0.95, length of aperture 0.8 mm.; a trifle over 6 whorls.

A single perfect example of this *Miralda* was found in beach debris on Kahoolawe, and two from near Honolulu. It is obviously distinct from *O. scopulorum* Watson, the only related species described from the islands.

*Odostomia* (*Miralda*?) *pupu* n. sp. Fig. 16.

Waikiki beach, near Honolulu, Oahu. Type No. 93943, A. N. S. P.

The shell is oblong-conic, white, solid. Nuclear whorl is rounded, rather elevated, smooth. Subsequent whorls of the spire are sculptured with three smooth, subequal, strongly raised spiral keels, their summits rounded. The intervals are equal to the keels in width, and have sculpture of spaced axial threads. On the last whorl there are six spirals, the anterior two very low. The aperture is ovate, oblique. Columellar fold is rather strong.

Length 2.4, diam. 1.05, length of aperture 0.75 mm.;  $5\frac{1}{2}$  whorls.

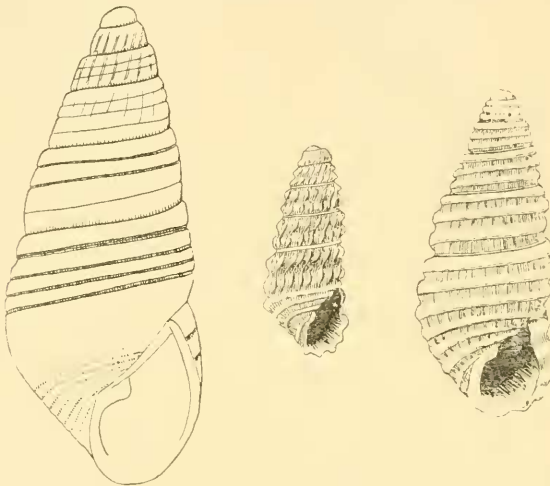


Fig. 14.—*Odostomia*  
*stearusiella*.

Fig. 15.—*Odostomia*  
*paulbartschi*.

Fig. 16.—*Odostomia*  
*pupu*.

*Odostomia* *Evalina* *waikikiensis* n. sp. Fig. 17.

Waikiki, Oahu. Type No. 117624, coll. by Pilsbry, 1913.

The shell is oblong-conic, white. Nuclear whorls subglobose, uptilted, half immersed. The next two whorls appear to be smooth except for some fine vertical striation. Last three whorls have sculpture of numerous very low axial folds crossed by rather coarse impressed lines, of which there are 15 on the penult whorl. On the last whorl the axial folds weaken as they approach the periphery; and do not pass upon the base. The whorls are rather convex, the suture deeply impressed. The aperture is ovate. There is a small, immersed columellar fold, visible in an oblique view, but not in front.

Length 2.8, diam. 1 mm., length of aperture 0.8 mm.;  $5\frac{1}{2}$  post-nuclear whorls.

*Odostomia (Evalina) haleiwnensis* n. sp. Fig. 19.

Haleiwa, Oahu. Type and a smaller specimen No. 116546, A. N. S. P., collected by Pilsbry, 1913. Paumalu, coll. by Mrs. A. F. Letson.

The shell is imperforate, oblong. The nuclear whorls are depressed. Axial sculpture consists of numerous extremely low plications, which become still weaker on the last whorl. These are crossed by fine, impressed spiral lines, of which there are about 10 on the penult whorl. The whorls are rather convex, parted by a deeply impressed almost channelled suture. Aperture is ovate. Columellar fold low but distinct, scarcely visible in a direct front view.

Length 3, diam. 1.05, length of aperture 1 mm.:  $5\frac{3}{4}$  whorls.

It is closely related to *O. gracilis* Pease, yet much smaller in all its parts, less densely striate spirally, and less attenuated near the summit.

*Odostomia (Evalina) gracilis* Pease. Fig. 18.

*Odostomia gracilis* Pease, Amer. Jour. of Conch. Vol. III, p. 292, Pl. 24, fig. 20 (Hawaii).

Pease confused two species under *gracilis*. His description was evidently framed to cover both; but the figure was drawn (very

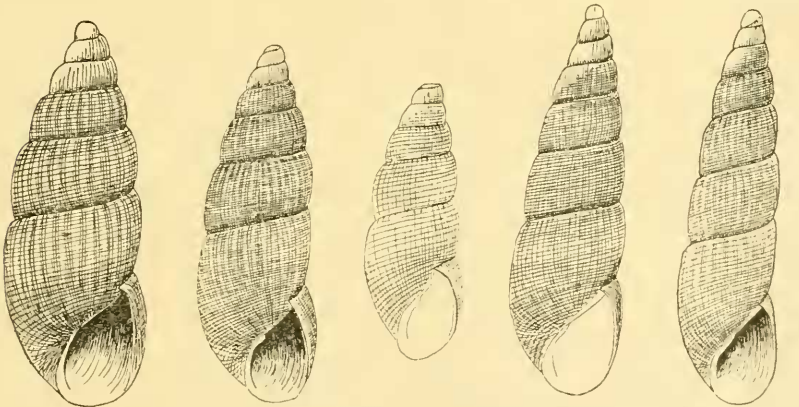


Fig. 17.—*O. waikikiensis*.

Fig. 18.—*O. gracilis*.

Fig. 19.—*O. haleiwnensis*.

Fig. 20.—*O. e. nematoderma*.

Fig. 21.—*O. clecta*.

badly) from the stouter shell, and I have selected this as the type (fig. 18). It is No. 19967, A. N. S. P.

The surface is inconspicuously and very weakly plicate, and densely striate spirally. The lateral outlines are distinctly convex.

The suture is narrowly channelled. Length 3.85, diam. 1.45, length of aperture 1.1 mm.

*Odostomia (Evalina) eclecta* n. sp. Fig. 21.

Haena, Kauai. Type No. 117599, A. N. S. P., coll. by W. A. and E. L. Bryan. Paratypes in Bryan coll. Also from Oahu at Paumalu and Honolulu Harbor, W. A. and E. L. Bryan, and Kahala, Mrs. A. F. Letson.

The shell is subulate, slender, white. Nuclear whorl globose. Succeeding whorls are rather convex, separated by a narrowly channelled suture, having axial sculpture of very low, scarcely noticeable plications, crossed by very numerous spiral threads, which are a little unevenly spaced. The suture is deeply impressed and crenulated by the axial folds. The aperture is ovate, oblique. There is a low columellar fold.

Length 4.15, diam. 1.1, length of aperture 1.1 mm.;  $6\frac{1}{2}$  post-nuclear whorls.

This slender species has the contour of *Turbonilla*. It was confused by Pease with his *O. gracilis*.

Some of the specimens taken at Kahala, Oahu, have two cinnamon bands.

*Odostomia eclecta nematoderma* n. subsp. Fig. 20.

Waikiki beach, Oahu. Type No. 93953, A. N. S. P.

The shell is turritid, resembling *O. eclecta* except that the form is constantly stouter, tapering more rapidly. Sculpture of crowded, unequal spiral threads. There is scarcely any trace of axial plication, though there are some impressed lines. The type is white, but several smaller specimens in the lot have two cinnamon bands, one at the periphery of the last whorl, the other midway between that and the suture.

Length 4.2, diam. 1.2, length of aperture 1.2 mm.;  $6\frac{1}{2}$  post-embryonic whorls.

*Odostomia (Cyclodostomia) suta* n. sp. Fig. 22.

Waikiki beach, near Honolulu. Type No. 93942, A. N. S. P., collected by Frederick Stearns.

The shell is oblong-conic, with obtuse (worn) summit. Subsequent whorls of the spire are concave in the middle, with large elevated spiral cords contiguous to the suture above and below. In the upper whorls the cords are closely pressed together across the suture. The last whorl has three cords, one subsutural, another peripheral

and the third smaller, below the periphery. The aperture is ovate; columellar fold deeply immersed.

Length 1.9, diam. 0.9 mm.

Four specimens, of which the most perfect has been selected for type and figure. The largest is more than twice the size of this one, but the base and aperture are broken. It belongs to the subgenus *Cyclodostomia*, apparently.

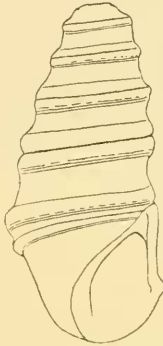


Fig. 22.—*Odostomia suta*.



Fig. 23.—*Odostomia letsonae*.

*Odostomia letsonae* n. sp. Fig. 23.

Paumalu, Oahu. Type No. 117600, A. N. S. P., collected by Mrs. A. F. Letson.

The shell is oblong-conic, white. Nuclear whorls are worn. The rest of the whorls of the spire have two broad, rounded, contiguous spiral ridges in the upper part. In the last whorl the ridges are more separated, the lower one being narrower and median on the whorl; there is also a third and smaller ridge around the axial region. Over the whole surface there is a dense microscopic spiral striation. The aperture is oblique, the outer lip irregular. The columella is very thick, but shows no fold.

Length 2.6, diam. 1.1, length of aperture 0.85 mm.; 8 whorls.

The subgeneric position of this strongly sculptured little *Odostomia* is not clear to me. In Dr. Bartsch's key it comes nearest to *Cyclodostomia*. It was picked from beach debris by Mrs. Letson, whose work on the minute shells of this locality has brought many interesting species to light.

*Odostomia* (*Odostomia*) *kahoolawensis* n. sp. Fig. 24.

Northern shore of Kahoolawe. Type No. 116166, A. N. S. P., coll. by Pilsbry, 1913.

The shell is imperforate, conic, grayish white, with some opaque

white spiral bands. The nuclear whorl is rather large, moderately elevated, the tip turned in. Subsequent whorls are smooth, moderately convex, separated by a deeply but narrowly impressed suture. The aperture is ovate, oblique. Columellar fold strong and sharp. Within the outer lip there are several spiral liræ, which show through the shell as white bands, visible externally.

Length 1.5, diam. 0.9, length of aperture 0.75 mm.;  $4\frac{1}{2}$  whorls.

*Odostomia (Odostomia) loxocephala* n. sp. Fig. 26.

Haena, Kauai. Type No. 117598, A. N. S. P., coll. by W. A. and E. L. Bryan.

The shell is conic, whitish, entirely smooth. The nuclear whorl is large, subglobose, set excentrically at the summit. Following whorls are moderately convex, with a few white axial lines but no

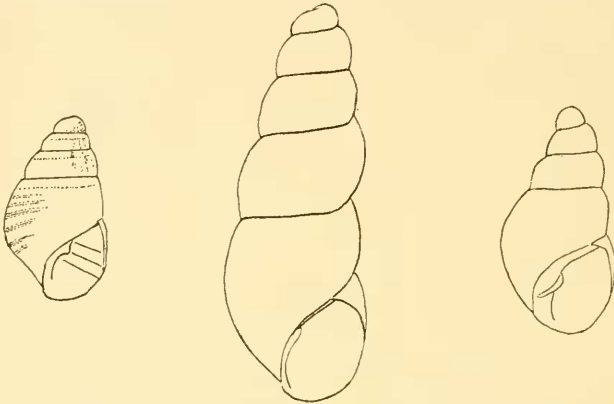


Fig. 24.—*Odostomia kahoolawensis*.

Fig. 25.—*Odostomia gulicki*.

Fig. 26.—*Odostomia loxocephala*.

striae. The aperture is large, ovate and oblique. The strong columellar fold emerges.

Length 1.85, diam. 0.95, length of aperture 0.8 mm.; 4 whorls.

The initial whorl is more elevated than in *O. kahoolawensis*.

*Odostomia (Odostomia) gulicki* n. sp. Fig. 25.

Waikiki, near Honolulu, Oahu. Type No. 93949, A. N. S. P. Also Haena, Kauai, Bryan.

The shell is rather thin, white, slowly tapering to the obtuse summit. Initial whorl well elevated, smooth. Following whorls are rather strongly convex, smooth except for very faint growth-lines, no microscopic striation visible. The suture is deeply impressed. The aperture is oblique, broadly oval. Columellar fold weak and low.



Length 2.2, diam. 0.85 mm.;  $5\frac{1}{2}$  whorls in all.

This small, smooth species appears to belong to the section *Brachystomia*.

*Odostomia (Nesiodostomia) prima* n. sp. Fig. 27.

Mokapu Point, Oahu. Type No. 117622, A. N. S. P., collected by W. A. and E. L. Bryan. Paratypes in Bryan collection.

The shell is cylindric-fusiform, strong, glossy, white, with a broad gray margin below the suture and a broad tawny zone in the middle of the last whorl, its upper edge showing as a band above the suture on two or three whorls preceding. Sculpture of indistinct spiral impressed lines, rather widely spaced, and a few irregular axial lines. The nuclear whorl projects somewhat nipple-like, its tip turned in. Subsequent whorls are nearly flat, parted by a narrowly but deeply cut suture. The aperture is narrowly piriform. The outer lip is thin, and arches slightly forward. The inner margin is covered with a heavy callous, which spreads well forward. It is straight except near the base, where it passes into the narrow, deeply concave columella. Internally there is a spiral fold, which does not emerge to the aperture, and is visible only on breaking the shell.

Length 7.4, diam. 2.2, length of aperture 3.2 mm.; 7 whorls.

This species may be considered the type of the subgenus *Nesiodostomia*, characterized by the straightened inner lip, covered with a heavy, spreading callous, the columellar fold deeply immersed. The aperture is shaped much as in *Subularia*.

*Odostomia (Nesiodostomia) secunda* n. sp. Fig. 28.

Mokapu Point, Oahu. Type No. 117620, A. N. S. P., collected by Mrs. A. F. Letson. Paratypes in Bryan collection.

The shell resembles *O. prima* in form. It is chamois colored, imperfectly transparent, having a wide gray sutural margin. The surface is glossy, and shows some impressed axial striæ. The last whorl descends shortly to the aperture.

Length 4.2, diam. 1.3, length of aperture 1.6 mm.; 5 post-nuclear whorls.

While this is evidently adult, by the descent of the suture just preceding the aperture, it is much smaller in all its parts than *O. prima*, and quite unlike young shells of that species of the same length.

*Odostomia (Nesiodostomia) tertia* n. sp. Fig. 29.

Paumalu, Oahu. Type No. 117621, A. N. S. P., collected by W. A. and E. L. Bryan.

The shell is aculeate, the upper half of the spire attenuated, lateral

outlines distinctly concave; chamois colored with a wide, more grayish border below the suture and an ill-defined cinnamon zone around the middle of the last whorl, the base below it almost white. The surface is glossy, with weak sculpture of spiral impressed lines and slight, coarse axial striæ. The summit is broken. Remaining whorls of the spire nearly flat, the last long, weakly convex. The suture is but slightly impressed, and descends rather abruptly but shortly to the aperture. The aperture is very narrowly piriform. The outer lip arches gently forward. The inner margin is convex, covered with a spreading callous. Columella is narrow, deeply concave, and very short.

Length 7.7, diam. 2.3, length of aperture 3.3 mm.; 7 whorls remaining, the summit broken.

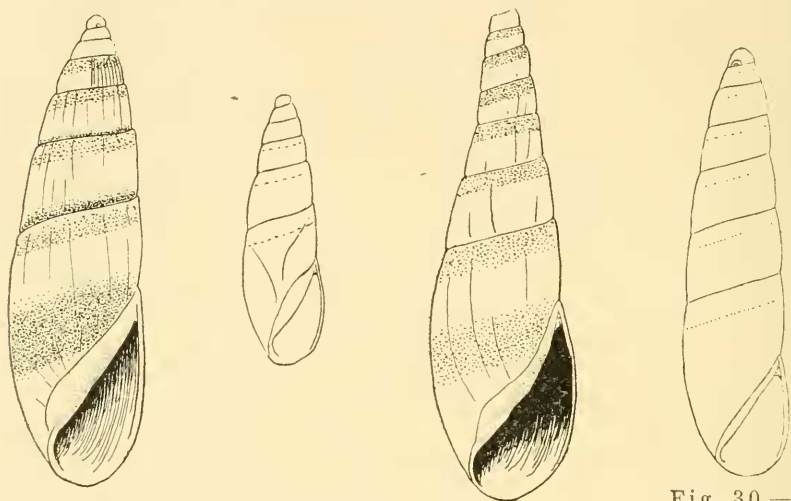


Fig. 27.—*Odostomia prima*.

Fig. 28.—*Odostomia secunda*.

Fig. 29.—*Odostomia tertia*.

Fig. 30.—*Odostomia quarta*.

*Odostomia* (*Nesiodostomia*) *quarta* n. sp. Fig. 30.

Waikiki beach, Oahu. Type No. 93927, A. N. S. P., coll. by F. Stearns.

The shell is cylindric-tapering, smooth, very glossy, cinnamon-rufous. A wide subsutural margin is defined by a rather indistinct line in the color. Outlines of the spire are barely convex, nearly straight. The nuclear whorl is large, on edge, hemispherical; subsequent whorls are nearly flat, separated by a narrowly impressed suture; the last whorl tapering below. The aperture is sub-piriform. The inner margin is straight, rather heavily calloused. Columella

is very short and concave. The outer lip arches well forward in the middle.

Length 3.4, diam. 0.9, length of aperture 1 mm.;  $5\frac{1}{2}$  post-nuclear whorls.

The slender figure, the narrow form of the aperture and the glossy surface give this little shell a superficial likeness to the genus *Strombiformis*.

## VI. THE OSTREIDÆ.

Of the four species of *Ostrea* known from the islands, two are apparently extinct. The existing species are quite small oysters. *O. sandwichensis* is common on stone and shell bottom in Pearl Harbor. *O. hanleyana* appears to inhabit open shore and reefs.

Professor Bryan<sup>2</sup> has recorded the unsuccessful attempts to introduce eastern and Californian oysters. It could not reasonably be expected that oysters from waters so much colder would thrive, and so far as is known, they have died out completely. There is a large valve of the Virginia oyster in the Bryan collection, picked out of material dredged in Honolulu Harbor, probably a ballast shell.

*Ostrea sandwichensis* Sowerby. Pl. XXI, figs. 4 to 8.

1871. *Ostrea sandwichensis* SOWERBY, Conch. Icon. Vol. 18, Pl. 27, fig. 66 (Sandwich Islands).

1916. *Ostrea rosacea* Bryan, Natural History of Hawaii, p. 457, Pl. 104, fig. 8.

Oahu: Eastern Loch (Pilsbry), Ford's Island and Waipahu (Bryan), in Pearl Harbor, fossil at the latter place. Honolulu Harbor (Bryan).

Kauai: Luualalei basin, Milolii, fossil (Bryan).

Molokai: Kainalu (Bryan).

This fluted oyster is abundant in Pearl Harbor. It rarely exceeds a length of 35 or 40 mm., and is usually smaller. It varies from rounded to subtriangular in contour. The attached valve is generally strongly plicate at the free edge. The other valve may be strongly plicate, but is often nearly smooth. In color it varies from dull purple to pale fleshy, with or without purple rays or clouds. The interior is whitish or olive. There is more or less minute crenulation near the hinge. The valves are of the same size, or the lower one may project very slightly beyond the other. The specimens growing on *Trochus sandwichensis* imitate the sculpture of the gastropod (fig. 8, Ford's Island). Figs. 4 and 5 are from examples taken in the Eastern Loch.

A fossil form from Ford's Island, Pearl Harbor is heavier and in

<sup>2</sup> The Natural History of Hawaii, p. 445.

the average larger than *sandvichensis*; there is rarely any trace of corrugation, and the beaks are often very long. This form may prove to be a distinct species when perfect specimens come to hand. It may temporarily be called *O. sandvichensis margarita* (Pl. 21, fig. 9).

According to Bryan, the native name of this oyster is *piocoe*. It is too small to be of economic value.

*Ostrea hanleyana* Sowerby. Pl. XXI, fig. 1.

1871. *Ostrea hanleyana* Sowerby, Conch. Icon. Vol. 18, Pl. 28, fig. 72 (Sandwich Islands).

Oahu: Mokuoloe Island, Kaneohe Bay (Kuhns and Thaanum); Mokapu Point; Paumalu (Bryan). Molokai: Kainalu (Bryan). Hawaii: Hilo (Thaanum).

This is a rounded or oval oyster, usually showing slight traces of fluting, or in others this is scarcely noticeable, creamy white outside, *white within*, or having vinaceous stains. The attached valve generally projects broadly beyond the other. The adductor scar is small, shortly oval. There is some minute crenulation of the inner edges near the beaks, which are always very short. The usual length is 35 to 60 mm.

*Ostrea retusa* 'Pease' Sowb. Pl. XXI, figs. 2, 3.

1871. *Ostrea retusa* Pease, SOWERBY, Conch. Icon. Vol. 18, Pl. 19, fig. 42 (Sandwich Is.).

1916. *Ostrea retusa* Pse., BRYAN, Natural History of Hawaii, p. 115 (Pearl Harbor, fossil).

Pearl Harbor, Oahu (Bryan, Kuhns, Pillsbury).

This oyster has not yet been found living, the specimens being from deposits believed to be pleistocene, on the shores of Pearl Harbor. I found it in abundance in a railroad cut about one-fourth mile east of Waipio, where a section of the ancient oyster bed is exposed.

It has been taken by Prof. and Mrs. Bryan at Waipahu, and by Kuhns and Bryan on the southern border of Ford's Island.

The extinction of the species may have been due to an inflow of hot water from one of the tufa cones northward, as Prof. Bryan suggests to me; or possibly a heavy fall of volcanic ash was blown over Pearl Harbor, and the shell fish were smothered by the turbid water. At all events, the species has not been found elsewhere in the islands, either recent or fossil. We may infer that it had been remarkably restricted in distribution for sometime previous to its extinction.

It is always a long, narrow oyster. The lower valve is frequently

somewhat fluted distally, though not often so much as in fig. 2. The flat upper valve is generally smooth except for the usual rough growth-lines. Both have crenulated inner edges when young, as shown in the figures, but this feature is generally indistinct or lost in old shells. The lower valve varies from having a rather deep beak-cavity to none. A large specimen measures 14 cm. long, 6 wide; others apparently adult are 10 cm. long.

*Ostrea bryani* n. sp. Pl. XX, figs. 1, 2.

Waianae, Oahu, from an excavation, about 20 ft. below the surface of a reef elevated 60 to 80 ft. above sea level. Collected by Wm. A. Bryan.

The shell is very large, ponderous, oblong, extremely thick. The more convex valve has a strong sculpture of rounded radial ridges, some of which branch; at the lower edge there are about 15. Inside, the beak occupies nearly half the total length. The flat valve has a thin layer of calcareous material over most of the outside, but it does not appear to be ribbed; towards the distal border, where it is not encrusted, some coarse concentric laminæ appear. Neither valve shows any crenulation of the inner borders.

Length of flat valve 210, width 140 mm. Weight of both valves 5 lbs. 9 oz.

This huge oyster differs from *O. hyotis* by its thick shell, long beaks and far smaller corrugations. The associated shells are recent species, so that the deposit is probably pleistocene.

## VII. VARIOUS GASTROPODS AND PELECYPODS.

*Strombus hawaiensis* n. sp. Pl. XXII, figs. 1, 2.

Pearl and Hermes Reef. Type collected by Lt. W. H. Munter. Kauai at Haena and Milolii; Oahu at Paumalu and Waianae; and Molokai at Moomuni, all collected by W. A. and E. L. Bryan.

The shell is turritid, speckled or mottled, and on the back of the expanded lip banded with white. The last 4 or 5 whorls are angular midway between sutures on the spire, and at the shoulder of the last whorl. The earlier whorls are rounded. Nucleus smooth; three following whorls having many low, narrow axial folds crossed by spiral threads; on the subsequent whorls the folds weaken above the angle and become nodular upon it; the slope above the angle becomes concave. On the last two whorls the axial folds disappear and the nodules become stronger. The spiral cords on the last whorl are strong and subequal below the nodules, weak above them. A lump precedes the anterior sinus of the outer lip. The lip expands, and is produced

upward in a long straight process, as in *S. aratum*. The aperture is white within, striate, especially above and below, the striae being weaker in the middle. The thick outer lip is tinged with brown at the edge. The callous of the inner lip and ventral face is white, with a faint brown tint on the convexity, but no chestnut blotch. Other characters about as in *S. aratum*.

Length 75, diam. about 41 mm.; 10 whorls.

While this shell has much in common with *Strombus aratum* Martyn, it differs in color of the aperture and ventral callous, and in the far stronger spiral sculpture. It appears to be widely spread in the islands, but is nowhere common.

*Phasianella variabilis* (Pease). Fig. 31.

In a peculiar color-variety of this species, which may be called mutation *trizonalis*, the pattern is reduced to three spiral bands.

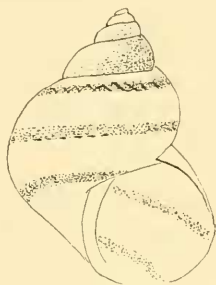


Fig. 31.—*Phasianella variabilis* mut. *trizonalis*.

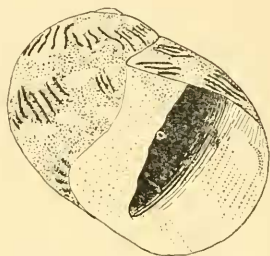


Fig. 32.—*Neritina bryanæ*.

It is from Kailua, Hawaii. Illustrated in fig. 31, from the Bryan collection.

*Neritina bryanæ* n. sp. Fig. 32.

Paumalu, Oahu. Type No. 117631, A. N. S. P., coll. by W. A. and E. L. Bryan. Paratypes in Bryan collection.

The shell is very small, semiglobose, polished, pale gray, having four principal spiral bands of oblong, opaque white spots, and two zones composed of fine reddish longitudinal lines. The spire is very short, whorls about  $2\frac{1}{2}$ . The aperture is very oblique. The callous is not extensive, bluish or grayish white. Columellar edge straight, having two or three teeth and notches barely indicated. In profile view a strong tooth may be seen at the upper third of the columellar edge. The operculum is unknown.

Length 2.1, diam. 2.2 mm.

*Tellina (Arcopagia) elizabethæ* n. sp. Pl. XXII, fig. 8.

Flint Island, coll. by C. D. Voy. Type No. 80253, A. N. S. P. Also Haena, Kauai, W. A. and E. L. Bryan. Hilo, Hawaii, D. Thaanuni.

The shell resembles *T. scobinata* (L.) but differs by the somewhat more produced beaks, the slopes in front and behind them straight, and inclined to form a smaller angle. The basal margin is less deeply curved. The posterior angle of the right valve is more prominent, and there is a broad concave depression before it. The scales of the surface are about half as large as in *T. scobinata*, much lower, and thicker, being lengthened granules rather than scales in the lower parts of the valves. Between the scales there are fine concentric striæ as in the other species; as in that, also, the scales are notice-

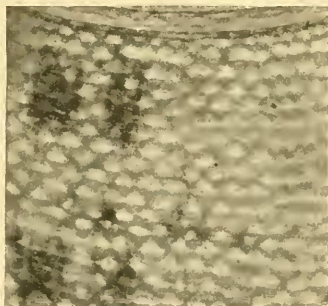
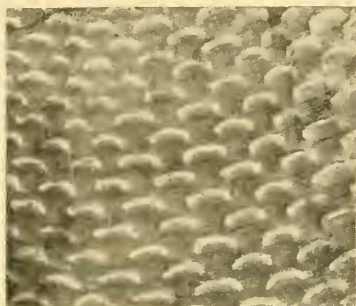


Fig. 33.—Surface of *Tellina scobinata*  $\times 3$ . Fig. 34.—Surface of *T. elizabethæ*  $\times 3$ .

ably larger in the right valve than in the left. The right valve is slightly larger, projecting above the left.

The shell is white, with a few rays of irregular cinnamon spots (which photograph abnormally dark). The interior does not differ materially from *T. scobinata*.

Length  $60\frac{1}{2}$ , alt. 57, diam. 27 mm.

Comparative views of the sculpture of *T. scobinata* (fig. 33) and *T. elizabethæ* (fig. 34) are from corresponding parts of the right valves of each.

Two valves from Haena are  $61\frac{1}{2}$  and 81 mm. long. The specimen from Hilo is young,  $32\frac{1}{2}$  mm. long. At this stage the processes of the surface are more scale like.

This species was recorded from Flint Island under the name *T. scobinata* in these Proceedings for 1905, p. 292. Its distinctness from that species was brought to my attention by Mrs. Bryan, for whom it is named. It has been compared with a long series of

*T. scobinata*, from the Loochoo Islands, various East Indian localities, and the Fijis.

A section *Scutarcopagia*, with *T. scobinata* as type, may be formed for the Arcopagiæ having scaly or granose sculpture.

*Tellina exculpta hawaiiensis* n. subsp.

Honolulu Harbor, Oahu, Bryan. Midway Isl., Mrs. D. Morrison. Ocean Island, Capt. J. H. Brown.

Differs from typical *T. exculpta* by having the thread-like striæ of both valves continuous over the posterior end, not interrupted in front of the posterior ridge and weakened behind it, as in *exculpta*. The posterior end is also a little wider.

Length 48.3, height 20.3, diam. 10.5 mm.

*Codakia thaanumi* n. sp. Pl. XXII, fig. 9.

Hilo, Hawaii. Type No. 115958, A. N. S. P., collected by Mr. D. Thaanum.

The shell is subcircular, rather convex, the diameter over half the height; white. Sculpture of unequal rounded radial ribs. On the anterior slope these ribs are narrower than their intervals; on the median segment they are decidedly wider; and at the posterior end, they abruptly become much smaller. There are 38 ribs exclusive of the fine posterior group. Over all there are fine, obtuse, subregular concentric threads, and a number of impressions denoting growth-arrest. The beaks are moderately prominent. The lunule is cordiform, small, and rather deeply impressed. The interior is white, tinted with sulphur yellow at the adductor scars; the tooth-plate and pallial line straw yellow. It has either very few or rather numerous punctures in the cavity. Teeth are substantially as in *C. punctata* (L.).

Length 53, alt. 52.5, diam. 28.3 mm.

This handsome clam is somewhat related to *C. punctata* (L.), from which it differs by the greater convexity and by the stronger, narrower ribs. It is also relatively higher, with more prominent beaks.

Some specimens have the whole interior sulphur yellow.

#### EXPLANATION OF PLATES XX, XXI, XXII.

PLATE XX. *Ostrea bryani*, n. sp. External and internal views of the valves of the holotype.

PLATE XXI.—Fig. 1. *Ostrea hanleyana* Sowerby. Mokuoloe Island, Kaneohe Bay.

Figs. 2, 3.—*Ostrea retusa* Sowerby. East of Waipio, Oahu. Two views of the same specimen, a lower valve growing upon an upper.

Figs. 4, 5.—*Ostrea sandvicensis* Sowerby. Eastern Loch of Pearl Harbor, No. 116680.



Figs. 6, 7.—*Ostrea sandvichensis*. External and internal views of a specimen from Ford's Island.

Fig. 8.—*Ostrea sandvichensis* growing on *Trochus sandvichensis*. Ford's Island, Pearl Harbor.

Fig. 9.—*Ostrea sandvichensis margaritæ*. Ford's Island, Pearl Harbor.

PLATE XXII.—Figs. 1, 2. *Strombus hawaiiensis* n. sp. Two views of the type. Pearl and Hermes Reef.

Fig. 3.—*Turbonilla vitiensis clavus* n. subsp. Viti Is.

Fig. 4.—*Turbonilla vitiensis* n. sp. Viti Is. No. 20046, A. N. S. P.

Figs. 5, 6, 7.—*Turbonilla varicosa* A. Ad. Honolulu.

Fig. 8.—*Tellina elizabethæ* n. sp. Flint Island.

Fig. 9.—*Codakia thaanumi* n. sp. Hilo, Hawaii.